Hydroxydione Sodium (Viadril®) for Anesthesia

A Report of Clinical Experience

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• **Hydroxydione sodium (Viadril®) is a new anesthetic agent, derived from a family of chemical compounds not previously associated with anesthetic properties—namely, the steroids. The use of Viadril in sixty operative procedures provided the basis of this communication, which reports the signs of anesthesia and the main pharmacophysiological effects of Viadril as observed clinically.**

HYDROXYDIONE SODIUM (Viadril®) is a steroid and is the first such product to be useful for producing anesthesia. Steroids of various kinds are produced in great quantities continuously by various organs of the body. These steroids play their roles in the economy of the human body and are then destroyed and eliminated. The capacity of the human body for the catabolism and elimination of steroids must be of a considerable magnitude.

Theoretically, then, the intravenous administration of Viadril into humans should not present, as other anesthetic agents do, an unusual demand on the tissues and organs of the body for the elimination of it. If clinical practice can substantiate this thesis, steroid anesthesia should eliminate most of the pathophysiological complications seen with other anesthetic agents.

This report is concerned with the use of Viadril in approximately 60 cases for anesthesia during surgical operation. In some cases the slow method of injection with 0.5 per cent solution of Viadril was used, which produced hypnosis in about ten minutes and anesthesia in 15 to 20 minutes, and in other cases the fast method of injection with 2.5 per cent solution of Viadril, which produced hypnosis in three to five minutes and anesthesia in seven to ten minutes, was used. Injection was not made directly into a vein by either method, but rather into a rapidly flowing intravenous infusion kit of 5 per cent dextrose in water which was connected to a large bore needle placed in a vein. This technique, which increased the dilution factor, was an attempt to diminish the irritant effect of Viadril on the intima of the vein.

Soon after hypnosis appeared, endotracheal intubation could be readily accomplished without the use of other anesthetic agents or the use of relaxant drugs. However, in almost all instances, supplementation with other anesthetic agents was necessary for complete surgical anesthesia. Nitrous oxide and oxygen was used for this purpose in practically all cases. Relaxant drugs to promote muscular relaxation were frequently used. Occasionally meperidine (Demerol®) or a barbiturate was added. In a few instances, patients received supplementary injections of Viadril, one receiving a total of 3 gm. In a few cases the technique was reversed by initiating anesthesia with barbiturates and relaxants and then maintaining anesthesia with Viadril, nitrous oxide and oxygen. Regardless of the method used, uniformly satisfactory results were obtained.

The minimal dose for adults (ages 14 to 67 in the present series) is relatively constant at 750 to 1,000 mg. Such an initial dosage will produce mild anesthesia for about 60 to 90 minutes. Larger initial doses were necessary to produce deeper anesthesia and increased duration. The most frequently used dosages were in the range of 1,250 to 1,500 mg.

Signs of Anesthesia

The signs of anesthesia with Viadril as they were observed in this series were:

1. Onset of hypnosis without a period of excitement.
2. Dilatation of the pupil as hypnosis appeared.
3. Mild hypotension which was usually transient.
4. Tachycardia, in most cases, which usually lasted 20 to 30 minutes and did not appear to be wholly related to hypotension.
5. Decrease in either respiratory rate or respiratory volume or both. The respiratory pattern varied considerably between patients. The most frequent observation was a decrease in depth of respiration of varying degree. Whenever a decrease in respiratory rate was observed, it was always accompanied by a decrease in respiratory volume. In a smaller group of patients apnea occurred, which necessitated manual ventilation for 30 to 60 minutes.

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The Viadril used in this study was supplied by Charles Pfizer & Co., Inc., Brooklyn, N. Y.

During the second hour of Viadril anesthesia, the effect of the drug begins to wear off and further medication is needed. The most important sign of lightening of anesthesia was a rather rapid constriction of the pupil from the dilated stage. Usually this phenomenon occurred three to five minutes before the usual signs of inadequate anesthesia appeared, which gave time for supplementation of anesthesia.

Pharmacophysiological Effects

Noteworthy pharmacophysiological effects of Viadril on patients observed in the present series were:

1. *Hypnosis and analgesia.* Viadril is similar to barbiturates, but has a slower onset and a greater duration of effect. Also, as with the barbiturates, the analgesic effect of Viadril appears to be minimal.

2. *Vagotropic effects.* Whereas barbiturates are mildly vagotonic in effect, Viadril is definitely vagolytic. Such an effect is evidenced by—(a) pupillary dilatation, (b) frequently observed tachycardia, and (c) ease of endotracheal intubation.

3. *Depression of vital centers of the brain.* The decrease in respiratory ventilation and the hypotension that follows the onset of anesthesia with Viadril suggests a depressant effect on the vital centers of the brain. This effect is most pronounced during the first 20 to 40 minutes of anesthesia. Such a duration of depression of vital centers contraindicates the use of Viadril for short procedures unless the anesthesiologist is prepared to support the patient until the function of the vital centers returns.

4. *Decrease in muscle tone.* In 15 to 20 minutes following the administration of Viadril, muscle tone decreased. In some instances, laparotomy was done without the need or use of muscle relaxant drugs. However, in most cases, muscle atony was insufficient and muscle relaxant drugs were needed.

5. *Rapid catabolism.* The emergence of patients from Viadril anesthesia was quite unique. As the hypnosis lessened, the patient entered a stage of excitement which usually lasted about 30 to 60 minutes. Although the patient appeared awake, he was unaware of his surroundings and was not cooperative. To prevent injury, he had to be watched. Emerging from the excitement period, the patient looked and felt alert. Postoperative nausea and vomiting was minimal (the incidence was less than 10 per cent). Patients who received Viadril did not have the "hangover" effects usually seen with other forms of general anesthesia. This postoperative effect of Viadril was most striking and certainly suggested a rapid and complete destruction of the steroid by the body, with an absence of toxic end products from such catabolism.

Very early in the series, the greatest disadvantage of Viadril became apparent. Viadril, even in weak solution, is highly irritant to the intima of veins. At the time of injection, patients complained of pain or discomfort in the extremity receiving the infusion. Further evidence of the irritating quality of Viadril on the vein was the high incidence—more than 50 per cent—of postoperative thrombophlebitis which was observed both in patients who had discomfort and those who did not at the time of injection. Thrombophlebitis caused discomfort for weeks. Not infrequently the discomfort of the thrombophlebitic vein outlasted the discomfort at the operative site by days to weeks. Although attempts to modify the technique of administration of Viadril to decrease the incidence of thrombophlebitis were made, no satisfactory solution to the problem was found.

The high incidence of thrombophlebitis due to the irritant quality of Viadril in solution will hinder the wide acceptance of an otherwise very useful and highly desirable anesthetic agent.

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